

# Claims

[c1] What is claimed is:

1. A multi-band low noise amplifier operated in a plurality of band modes comprising:  
a plurality of input amplifiers respectively corresponding to the plurality of band modes, each input amplifier comprising a receiving port for receiving a corresponding input signal in the band mode; and  
an output amplifier comprising:  
at least a lowest-impedance port being a lowest-impedance node of the multi-band low noise amplifier, the output amplifier being coupled to the plurality of input amplifiers at the lowest-impedance port; and  
an output port for outputting the input signal processed by the output amplifier.

[c2] 2. The multi-band low noise amplifier of claim 1 wherein the multi-band low noise amplifier can only operate in a band mode in a period of time, and only the input amplifier and the output amplifier corresponding to the band mode operate in the period of time.

[c3] 3. The multi-band low noise amplifier of claim 1 wherein the output port of the output amplifier is electrically

coupled to a loading impedance, and the loading impedance is an inductance or a resistance.

- [c4] 4. The multi-band low noise amplifier of claim 1 further comprising a plurality of negative feedback circuits, each negative feedback circuit comprising a resistor, a capacitor, and a switch.
- [c5] 5. The multi-band low noise amplifier of claim 1 further comprising a plurality of negative feedback impedances, the plurality of negative feedback impedances being respectively electrically coupled to emitters of the plurality of input amplifiers, each negative feedback impedance being an inductance or a resistance.
- [c6] 6. The multi-band low noise amplifier of claim 1 further comprising at least a negative feedback circuit, the negative feedback circuit being shared by the plurality of input amplifiers and electrically coupled to emitters of the plurality of input amplifier.
- [c7] 7. The multi-band low noise amplifier of claim 1 wherein the output amplifier is electrically coupled to each input amplifier in cascode connection.
- [c8] 8. The multi-band low noise amplifier of claim 1 wherein each input amplifier comprises at least a BJT (bipolar junction transistor), and the receiving port is a base of

the BJT.

- [c9] 9. The multi-band low noise amplifier of claim 8 wherein the output amplifier comprises at least a BJT, the output port is coupled to a base of the BJT, and the lowest-impedance port is coupled to an emitter of the BJT.
- [c10] 10. The multi-band low noise amplifier of claim 1 wherein each input amplifier comprises at least a MOS (metal-oxide semiconductor) transistor, and the output amplifier comprises at least a MOS transistor.
- [c11] 11. The multi-band low noise amplifier of claim 1 being applied to a receiver of a wireless communication system.
- [c12] 12. A method used in a multi-band low noise amplifier, the multi-band low noise amplifier comprising a plurality of input amplifiers and an output amplifier, the plurality of input amplifiers respectively corresponding to a plurality of band modes, the method comprising:  
utilizing the plurality of input amplifiers to respectively receive a plurality of input signals corresponding to the plurality of band modes;  
connecting the output amplifier to the plurality of input amplifiers at a lowest-impedance node of the multi-band low noise amplifier in cascode connection; and

utilizing the output amplifier to process and output the plurality of input signals.

- [c13] 13. The method of claim 12 wherein the multi-band low noise amplifier can operate in only a band mode in a period of time, the method further comprising:  
utilizing an input amplifier corresponding to the band mode to receive and process a corresponding input signal in the period of time; and  
utilizing the output amplifier to process and output the corresponding input signal.
- [c14] 14. The method of claim 12 wherein the plurality of input amplifiers respectively comprise at least a BJT (Bipolar junction transistor), and the lowest-impedance node of the output amplifier is coupled to a collector of the BJT.
- [c15] 15. A multi-band differential amplifier being operated in a plurality of band modes comprising:  
a plurality of input amplifiers comprising a plurality of positive input amplifiers and a plurality of negative input amplifiers, each band mode corresponding to a positive input amplifier and a negative input amplifier, each positive input amplifier comprising a positive receiving port and at least a positive negative feedback circuit for receiving a positive input signal in the corresponding band

mode; each negative input amplifier comprising a negative receiving port and at least a negative negative-feedback circuit for receiving a negative input signal in the corresponding band mode;

a positive output amplifier comprising at least a positive lowest-impedance port, the positive output amplifier being coupled to the plurality of positive input amplifiers in cascode connection at a positive lowest-impedance port, the positive output amplifier cooperating with a positive output loading impedance to output the processed positive input signal; and

a negative output amplifier comprising at least a negative lowest-impedance port, the negative output amplifier being coupled to the plurality of negative input amplifiers in cascode connection at a negative lowest-impedance port, the negative output amplifier cooperating with a negative output loading impedance to output the processed negative input signal.

- [c16] 16. The multi-band differential amplifier of claim 15 wherein in the positive output amplifier, the positive lowest-impedance port can be treated as a lowest-impedance node under the situation that the plurality of positive input amplifiers are electrically coupled to the positive output amplifier.

- [c17] 17. The multi-band differential amplifier of claim 15 wherein the positive output loading impedance and the negative output loading impedance are respectively an inductance or a resistance.
- [c18] 18. The multi-band differential amplifier of claim 15 wherein the positive negative feedback circuit and the negative negative-feedback circuit respectively comprise an impedance, and each impedance is an inductance or a resistance.
- [c19] 19. The multi-band differential amplifier of claim 15 wherein the positive negative feedback circuit is shared by the plurality of positive input amplifiers and electrically coupled to emitters of the plurality of positive input amplifiers; the negative negative-feedback circuit is shared by the plurality of negative input amplifiers and electrically coupled to emitters of the plurality of negative input amplifier.
- [c20] 20. The multi-band differential amplifier of claim 15 wherein in the negative output amplifier, the negative lowest-impedance port can be treated as a lowest-impedance node under the situation that the plurality of negative input amplifiers are electrically coupled to the negative output amplifier.